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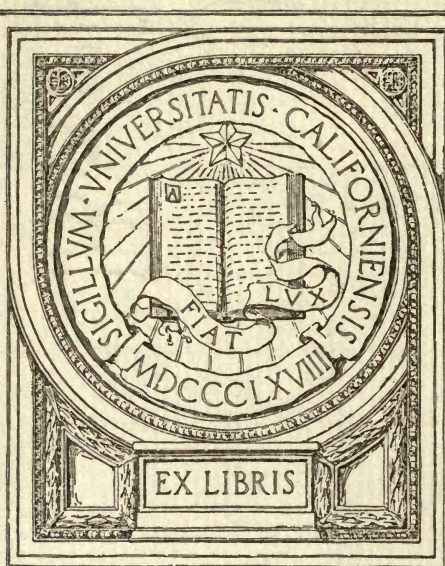


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A Review of the
North American Species of
AGABUS

Together with a Description
of a New Genus and
Species of the
Tribe Agabini

By H. C. FALL

MOUNT VERNON, N. Y.
JOHN D. SHERMAN, JR.

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A Review of the North American Species of Agabus

Together with a Description of a New Genus and Species of Agabini

By H. C. FALL

The genus *Agabus*, in the broad sense in which it is used by Sharp, and to which American students have become accustomed, includes, next to *Hydroporus*, a greater number of species than any other genus of North American Dytiscidae. Not since the appearance of Sharp's Monograph in 1882 has any general survey of our Agabi been offered, and the arrangement of species in both the Henshaw and Leng Lists is substantially in accord with Sharp's treatment.

First and last a considerable number of genera have been established at the expense of *Agabus*, most of which are rejected, at least in the full generic sense, by Sharp. In a restricted sense nearly all our species belong to *Gaurodytes* of C. J. Thomson, under which name they were treated by Crotch in his Revision of 1873, and which has recently been fully accepted by Zimmermann. Sharp does not accept this and other genera, for, as he says, Thomson "unfortunately relied largely on one (character) which is very unsuitable for the purpose of arriving at a natural classification; I am alluding to the size and form of the wings of the metasternum; so variable is this character that scarcely any two species can be found agreeing as to it, and on the other hand, species which are nearly or quite conformable as to this, are really by no means naturally allied by their other characters." Of typical *Agabus*, as represented by the *serricornis* of the Palearctic fauna, we have the single species *clavatus* Lec., which like *serricornis* is remarkable in having the apical joints of the antennae in the male dilated and compressed, and has the metasternal laciniae relatively narrow, this latter character however being less extreme in *clavatus* than in *serricornis*. Two species—*cordatus* and *rectus*—peculiar by the small nebrioid form of thorax, have been by LeConte and Crotch referred to *Anisomera* Brullé founded upon a Chilian species of small size and flavate color. Although quite unacquainted with the South American insect, this reference seems to me extremely questionable. It is probable however that these two species belong to *Hydronebrius*

Jakovl., rated by Zimmermann as a subgenus of *Gaurodytes*, and for the present I content myself with placing them at the head of our series of species, where they constitute a very distinct group of probably subgeneric value.

Sharp regarded the genus *Agabus* as one "of extreme difficulty, so far as regards the determination of species." He arranged the species in twenty-three groups, "some of them natural, some clearly artificial," but made no attempt to tabulate either the groups or the species within them. Zimmermann¹ in his recent work declares himself completely baffled in his attempts to define natural groups in *Agabus* on external characters, but he has established three sections of the genus based on differences in the genital armature in the males. I am by no means certain that these constitute natural groups, in fact unless there has been some mistake in the identification of our species, the referring of such manifestly closely allied forms as *obsoletus* and *morosus* to different sections would seem to militate against it. I shall therefore for the present not attempt the subdivision of the genus into groups, but will present our species in a single table, the mutual relationships being indicated so far as may be by the tabular arrangement and by comments in the text.

After eliminating *cordatus*, *rectus* and *clavatus*, I shall follow Sharp in using as a first criterion the form of the prosternal process. There is really no well marked line of demarcation anywhere between the broader and flatter form generally characteristic of this process in the species at the beginning of the table, and the narrower strongly convex or carinate form prevailing further along in the series, so that care must be taken to check up conclusions by means of correlative characters, while a few correctly determined species as standards of reference will be of material service to the student. The sexual modifications of the male pro- and mesotarsi, more especially of the protarsal claws are of much importance in the determination of species and should always be accurately noted. About the only other character used, of which preliminary mention need be made, is the sculpture of the elytral surface. This consists universally of a reticulation, of which the meshes vary greatly in size, form and degree of uniformity in the different species, a minutely critical examination of which is necessary for the successful use of the table, and which will always prove of the highest value in the identification of the rather numerous species which to the casual glance, or under too low amplification, seem monotonously similar. It may aid in the interpretation of the descriptions to say that the strongest obtainable simple lens—a one-fourth inch triplet—has been used in my own study.

¹Die Schwimmkäfer des Deutschen Entomologischen Museums zu Berlin—Dahlem.

In the preparation of the present paper I have been greatly indebted to my friend Mr. John D. Sherman, Jr. for the privilege of unrestricted study of his very rich collection, and for the loan and gift of specimens. Mr. J. B. Wallis of Winnipeg has assisted materially with good series of the numerous species taken by him in various parts of Manitoba and British Columbia. To Mr. C. A. Frost, Chas. Liebeck and Chas. Dury, I am indebted for material contributed with equally good will if in lesser numbers, to all of whom I wish to express sincere appreciation. I have, of course, carefully examined the types in the Museum of Comparative Zoology at Cambridge, which thanks to the courtesy of Dr. Henshaw and Mr. Banks have been freely available for study; while Dr. Lutz and Mr. Mutchler have kindly granted similar privileges with the Roberts collection in the American Museum of Natural History. To Mr. Arrow of the British Museum I owe especial thanks for his kindness in sending to me for examination one of Kirby's original specimens of *A. phaeopterus*, and typical examples of several of Sharp's species, as well as notes made at my suggestion on other species which could not be sent out from the museum. The types of all new species herein described, unless otherwise indicated remain in my own collection, which contains all the species here recognized.

Table of Species

- | | |
|---|-----------------|
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- with more or less distinct sublateral yellow spot or vitta behind the middle; hind tibiae without row of punctures along inner margin (except *amplus*); size moderate to large.....5
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28. Metasternal wings shorter, the distance separating the meso-coxal cavity from the coxal plate less than half the length of the latter; prosternal process rather less narrow and less convex.....*discolor*
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- Elytra dark brown to yellowish brown, thorax black.....*phaeopterus*
 Elytra nearly black like the thorax, the margins only narrowly brownish*bicolor*
- 32.** Male protarsi very feebly dilated, and with small palettes beneath; intralinear area of hind coxae not rugose.....*confinis*
 Male protarsi rather broadly dilated, with large palettes beneath; intralinear area of hind coxae rugose.....*infuscatus*
- 33.** Prosternal process flat, the surface a little concave at the point of maximum width; side margins of the thorax in the female sinuate at front angles; color above brownish fuscous, with sides and transverse median fascia or entire apical half of thorax, and side margins of elytra, testaceous*arcticus*
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- 35.** Color blackish brown, the prothorax nearly black except the side margins; protarsal claws of male elongate, nearly straight, sinuate, equal, claw joint not toothed beneath.....*ontarionis*
 Color above and beneath dull brownish testaceous, or yellowish brown.
 Protarsal claws of male elongate, equal, the claw joint dentate beneath*ajax*
 Protarsal claws of male very unequal, the anterior scarcely half the length of the posterior.....*coxalis*
- 36.** Pro- and mesotarsi of male with extremely large circular palettes beneath; metasternal groove long; size rather small or moderate (7 to 8 mm.)*anthracinus*
 Pro- and mesotarsi of male with much smaller though quite distinct palettes; metasternal groove short, rudimentary; size large (9 to 11 mm.)*nigroaeneus*
 Pro- and mesotarsi of male without distinct palettes beneath..... **37**
- 37.** Meshes of elytral reticulation not longitudinal (sometimes oblique basally in the female of *tristis*.) **38**
 Meshes of elytral reticulation wholly or in great part strongly elongate (less conspicuously so in the male of *leptapsis*.) **39**
- 38.** Metasternal groove rudimentary; middle coxae narrowly separated *confertus*
 Metasternal groove well developed, subhorizontal; mesocoxae less approximate.
 Form rather broadly oval, color black, size smaller (8 to 9 mm.) *gagates*
 Form elongate oval, color brownish to blackish fuscous, size larger (9½ to 10½ mm.)*tristis*

39. Side margins of prothorax rather narrow; coxal plates distant from the mesocoxal cavities by fully half their own length.....**leptapsis**
 Side margins of prothorax very broad; coxal plates distant from mesocoxal cavities by much less than half their own length.....**discors**
40. Rufo- or brownish testaceous elytra a little darker; coxal plates large; metasternal wings sublinear—length about $7\frac{1}{2}$ mm.; (Nebraska to British Columbia.)**clavatus**

A. cordatus Lec. Proc. Acad. Nat. Sci. Phila., 1853, p. 226.

Very easily recognized by the small subcordiform thorax, which is not approached by any other of our species except *rectus*. The color is not truly black, the upper surface being rather piceous, obscurely tinged with rufous, and feebly aenescent. The four anterior tarsi of the male are moderately dilated, and the protarsal claws not sexually modified. Length 8.7 to 9.2 mm.

A not uncommon species in the Rocky Mountain Region, and known to me from Montana (Missoula); Colorado (Colorado Springs and Leadville); New Mexico (Pecos); and Utah (Ft. Douglas). The type is from Santa Fé, New Mexico.

A. rectus Lec. Annals Mag. Nat. Hist. (4) IV, 1869, p. 375.

Closely similar in general aspect to *cordatus*, but the prothorax is scarcely cordiform, the sides less convergent and nearly straight posteriorly. The color is more truly black, the upper surface entirely devoid of rufous marks or shades in the few examples seen. Length 9 mm.

This is a distinctly rarer insect in collections than the preceding. It was described from Vancouver, and is known to me also from Washington State (Wawawai—M. C. Lane).

A. spinipes Sharp. Biol. C. Am. I, 2, p. 32.

Moderately broadly oval, subdepressed, outline of thorax and elytra nearly continuous; black, opaque; labrum, clypeal margin, two obscure vertex spots, mouth, antennae and legs, rufous. Surface densely deeply reticulate, the meshes small, variable in form and size, and in part on the elytra having the appearance of small flattened granules. Head two-thirds as wide as the prothorax, the latter rather more than twice as wide as long, distinctly lobed at base, lateral bead rufescent, sides sinuate at front angles in the female. Elytra seven-tenths as wide as long, sides evenly arcuate, apex obtusely rounded, each with the usual series of coarser punctures; minute punctulation indistinct because of the density and roughness of the reticulation. Antennae short and rather thick, the intermediate joints only about one-third longer than wide. Prosternal process broad, feebly convex or flattened, widely margined, the apex bluntly acute; metasternal wings rather wide between the middle coxae and coxal plates. Sculpture beneath and legs much as usual, the hind tibiae with a row of coarse elongate punctures along the inner margin. Male with anterior tarsi a little dilated basally, the first and second joints only clothed beneath with glandular hairs, which are tipped with small palettes; the middle tarsi undilated and quite devoid of sexual pubescence; protarsal claws not perceptibly modified; no sexual difference in surface sculpture. Length 6.8 mm.; width 3.5 mm.

Of this remarkable species there is a male specimen in my own collection from the Huachuca Mts., Arizona. Two examples (σ^2) in the Sherman collection, and a third example in the Roberts collection, all from the Organ Mts., New Mexico, agree in all essential characters, but vary in having the surface feebly aenescent, the elytra each with a vague longitudinal sulcus between the rows of coarser discal punctures, the latter being more distinct than in my specimen and the prosternal process flat or a little impressed and more or less rugose at its broadest part.

This small opaque species is peculiar in its unusually short and stout antennae and broad prosternal process, and quite unique in its limited sexual clothing of the male tarsi. The metatarsal claws are similar to, and quite as large as those of the pro- and mesotarsi.

A. semivittatus Lec. Ann. Lyc. Nat. Hist., New York, 1851, p. 204.
texanus Shp. On Dytiscidae p. 505.

A strongly shining black species of medium size, the elytra with a sublateral yellow vitta in nearly the posterior half, which is, however, sometimes interrupted or quite obscure. Elytral reticulation fine and feeble, the areolae unequal and of irregular form. All the essential characters are set forth in the table of species. The very broad flattish prosternal process, itself widely margined for some distance behind the coxae, combined with the very small area of the basal tarsal joint clothed with glandular hairs in the male afford a reliable means of identification. The four anterior tarsi are only just visibly dilated in the male, the pads of adhesive pubescence narrow and densely set with moderately small pallettes. Length 7.5 to 8.8 mm.

Semivittatus is widely dispersed in the great interior region of the continent but seems not to attain the coast line of either the Atlantic or the Pacific. Specimens have been seen from Ontario, Canada; Ohio (Cincinnati); Illinois (Edgebrook); Nebraska (Malcom and Kearney); Louisiana (Winnfield); Texas (Waco); Colorado (Boulder); New Mexico (Las Vegas); Arizona (Tucson).

Some examples, more especially those from Texas and the southwest are a little less evenly oval than the typical form of the species, but the difference is extremely illusory and seems not to be supported by any structural characters. It is probable that the type of *texanus* Shp. is one of these slight variants; Sharp's description however fits just as well in all respects the typical *semivittatus*, and I can see no reason for giving *texanus* even varietal standing. The *semivittatus* of Sharp's monograph is not the species so named by LeConte, but a quite distinct species which is described below.

A. johannis new species.

This name is proposed for the *Agabus semivittatus* Lec. of Sharp's monograph. Knowing the true *semivittatus* of LeConte, it was at

once evident from Sharp's description of the male protarsal claws that he had something quite different in hand. The original of Sharp's description is now before me and may be briefly characterized as follows.

Rather larger but precisely similar in horizontal outline to *texanus* Shp., but distinctly more strongly convex in profile: color shining black, with a sublateral posterior yellow vitta of variable distinctness; hind margin of prothorax broadly subangularly rounded at middle (broadly evenly arcuate in *semi-vittatus*); elytral reticulation very fine, meshes very small and subequal throughout, the minute punctulation evenly distributed and distinct under sufficient amplification: protarsi of male rather feebly dilated but quite strongly compressed, the glandular pubescence beginning at about the middle of the basal joint; claws rather short, the anterior one with a strong angulate basal lobe, the posterior one broader but not lobed at base. Length 8.5 to 9 mm.

In *semivittatus* and *stagninus* the elytral reticulations are unequal and quite irregular in form and much less minute, the fine punctules excessively small and few in number.

Described from four examples (3♂, 1♀) from the British Museum, two of which bear the label "St. John's Bluff, E. Florida." The other two are probably from the same source though carrying no locality label other than "Am. bor."

Since writing the above I have received three examples (2♂s 1♀) from Mr. W. S. Blatchley, collected by him at Dunedin on the West Florida Coast ("2-22-22"). The male tarsal characters are precisely as in the East Florida type and there can be no doubt of their identity. The Dunedin specimens differ however in having the meshes of the elytra in the baso-sutural region distinctly unequal while in the female this inequality extends throughout the surface, the reticulating lines deeper and the surface less shining.

The type of *johannis* is returned to the British Museum; paratypes in my own collection include one male ("Am. bor") from the Sharp collection and the three Dunedin specimens mentioned.

A. stagninus Say, Trans. Am. Phil. Soc. II, 1825, p. 100.

striola Aubé, Spec. Gen., 1838, p. 308.

Extremely similar in nearly every feature to *semivittatus*, but of somewhat larger size, and distinguishable with certainty by the male tarsal characters. The anterior tarsi of the male are here quite distinctly dilated, the glandular hairs covering the apical half of the basal joint beneath as is usual. The front claw of the protarsus is not toothed, but the strong rectangular basal angulation is much more conspicuous than in *semivittatus*. As in the latter species, the extremely minute punctures occur on, and usually at the intersections of the reticulating lines, and not within the areolae. Length 9.2 to 10 mm.

This species is far more restricted in range than *semivittatus*. It is personally known to me only from Pennsylvania (Harrisburg), New Jersey (Anglesea), and North Carolina. It is given in the South-

western Pennsylvania and Washington Lists, but does not appear in the New Jersey List.

A. amplus new species.

Size large, form regularly ovo-elliptical, the prothorax and elytra perfectly continuous in outline. Color black, moderately shining, faintly aenescent, elytra with a small sublateral yellow spot behind the middle; mouth, antennae and legs dark rufous, body beneath rufopiceous. Head nearly two-thirds as wide as the prothorax, the latter more than twice as wide as long, side margins unusually broad. Reticulation of upper surface moderately fine, the areolae irregular and unequal, the reticulating lines with numerous fine punctures which occur for the most part at the intersections. Coxal plates large, the length of the metasternum between them and the mesocoxal cavities only about one-third their own length. Hind tibiae with a row of five or six punctures along the inner margin. Pro- and mesotarsi of male quite distinctly dilated and rather strongly compressed, the anterior protarsal claw thickened and sinuate beneath but without tooth. Length 11.5 mm.; width 6.25 mm.

Described from a single pair, submitted by Mr. Sherman. The male type retained in the Sherman collection is from Missouri: it was obtained from Oberthür and bears the name "brevicollis Lee" in Oberthür's hand. The female bears label "Kentucky, Sanborn."

Our largest species of *Agabus* and evidently quite a rarity. In addition to the tabular characters it may be distinguished from its nearest allies by the more broadly margined thorax. In neither of the two specimens at hand is there any trace of the rufous occipital spots which are normally present in *stagninus* and *semivittatus* though sometimes quite obscure.

A. obtusatus Say, Trans. Am. Phil. Soc. II, 1823, p. 99.

? *nitidus* Say, l. c. p. 98.

Broadly obtusely oval, polished black, elytra with apical and postmedian sublateral yellow spots. The lines of the elytral reticulation are very fine and lightly impressed, the areolae large, irregular, unequal, and each as a rule with one or more minute punctules. The length of the metasternum between the middle coxae and the coxal plates is scarcely more than one-fourth of the length of the latter. The male tarsi are only narrowly incrassate, the protarsal claws virtually unmodified, though on close inspection the anterior one may be seen to be faintly sinuate beneath. Length 7.3 to 8. mm.

This species ranges from Canada through the New England States as far south as the District of Columbia, and west to Iowa and Lake Superior. It superficially resembles rather closely *semivittatus*, but is rather smaller and more obtusely oval, and is otherwise easily separated by the tabular characters. It is most closely allied to *planatus*, which see for further comparison of characters.

A. planatus Shp. On Dytiscidae, p. 503.

Very closely related to the preceding species, from which it differs as follows: The size is slightly greater, the color less deeply black, but rather inclined to be

piceous, frequently tinged with rufous. The side margin of the prothorax is sensibly twice as broad as in *obtusatus*, and by this means the two may be readily separated. The reticulation of the upper surface is substantially as in *obtusatus*, but the areolae are of slightly smaller average size. The male tarsi are a little more incrassate, the protarsal claws slender, more elongate and less curved than in *obtusatus*, and with a more pronounced angulation at the extreme base. Length 7.5 to 8.5 mm.

Apparently an extremely local species, and aside from two examples from Staten Island in the Roberts collection it is known to me only from Marion, Mass., where on one occasion it was taken in some numbers by Messrs Bowditch, Blanchard and the writer, in the nearly dry bed of a small brook.

It may be well to remember that *planatus* and *obtusatus* are the only species of *Agabus* in our fauna having normally both postmedian and apical yellow sub-marginal spots. In *stridulator* (*semipunctatus* auct.) these spots are often seen, but the greater number of specimens in my series show no trace of them.

A. hypomelas Mann. Bull. Mosc. II, 1843, p. 221.

irregularis Mann. Bull. Mosc. III, 1853, p. 159.

Oblong oval, piceous or brownish piceous, distinctly aenescens; head in front, sides of thorax except at the hind angles, and sides of elytra, diffusely rufous; beneath piceous; antennae, mouth, epipleura and legs, rufous, the thighs in part dusky. Head notably large, prothorax with sides rather straight, not quite as wide at base as the base of the elytra, the outline therefore somewhat discontinuous; general form feebly obovate, the maximum width being at a little behind the middle of the total length. Surface reticulation rather fine, the meshes unequal, and toward the sides and apex exhibiting a secondary system of minute reticulation. The usual dorsal series of punctures are present on the elytra together with numerous minute punctules at the intersections of the reticulating lines. In the male the four anterior tarsi are slightly thickened, but the glandular hairs of the lower surface cover on the first joint only a small apical area. The protarsal claws of the male are slender, equal, and absolutely simple, and seem to be precisely alike in the sexes. Length 6.6 to 8.25 mm.

Occurs along the North Pacific Coast from the Aleutian Islands to British Columbia and Vancouver.

A well characterized species which should be easily recognized, but which often apparently is not, judging from the different names under which it appears in collections. The species has no close allies and does not fit in very smoothly anywhere. Because of a general similarity in the form of the prosternal process Sharp placed it in his Group 2 with *seriatus* and *lugens*, while stating that its "exact position is not easy to define." Though of about the same width and convexity, the prosternal process is rather shorter and less finely pointed (acuminate) at tip than in *seriatus* and *lungens*, and the metasternal cavity is correspondingly less developed. The restriction of the

glandular pubescence of the basal joint of the protarsus in the male to a small apical area recalls a similar condition in *semivittatus*. As a rule the basal joint is thus clothed in about its apical half.

A. seriatus Say, Trans. Am. Phil. Soc., II, 1823, p. 97.

striatus Aubé. Spec. Gen. 1838, p. 305.

arctus Melsh. Proc. Acad. Phil. II, 1846, p. 27.

parallelus Lec. Agass. Lake Sup., 1850, p. 213.

intersectus Cr. Trans. Am. Ent. Soc. IV, 1873, p. 419.

Elongate oval, black, aenescent, moderately strongly shining, the occipital and sub-lateral elytral spots obsolete; mouth and antennae rufous, legs obscure rufous or rufopiceous; elytral reticulation fairly strong, the meshes irregular in form; minute punctures sparse, and for the most part within the meshes. Front and middle tarsi of male perceptibly but not strongly incrassate, the anterior protarsal claw not very strongly arcuately dilated posteriorly. Length 8 to 9.3 mm.

This is one of the commonest, and if we have not confused two or more species is perhaps the most widely dispersed of any in our fauna. It is essentially a northern form, occurring entirely across the continent from Newfoundland (Mts. east of Codroy) to Vancouver, and in the Rocky Mt. region ranges as far south as New Mexico, and across the Great Basin to Nevada, Eastern California (Truckee; Lundy) and Eastern Oregon, but I have not seen it from the true Pacific fauna south of Victoria Vanc. Its southern limit in the East is a little uncertain. It is known to occur as far south as Washington, D. C., but its absence from the southwest Pennsylvania, Cincinnati and Iowa lists is at least significant.

This species shows quite a good deal of variation in form and outline. *Parallelus* Lec. was based on one of the narrower individuals from Lake Superior; similar specimens however are likely to turn up anywhere within the range, and every possible intermediate is present between this and the broader examples. For a like reason I have felt compelled to unite *intersectus* Cr. The type of this latter (from Eastern Oregon) would be absolutely lost in any considerable series of *seriatus* if locality labels were removed. The tooth of the anterior tarsal claw (δ) mentioned by Crotch as a distinguishing character is only a particle of adhering foreign matter, the form of the claw being really precisely as in *seriatus*. In many of the western specimens the base of the prothorax does not quite equal in width the base of the elytra, so that the outline is less continuous than in what we may call typical *seriatus*. The *intersectus* of Sharp's monograph was doubtless one of these specimens. The size of these examples, and in fact of western specimens generally is somewhat less than of those from the East, but all differences are extremely elusive and so completely gradational that I am at present quite unable to define a second species in the extensive material examined.

A. brevicollis Lec. Rept. Pac. R. R. Expl. & Surv. XII, 1857, p. 34.

Broadly obtusely oval and subdepressed; black, elytra with or without a small postmedian yellow spot near sides; occipital spots obsolete; antennae rufous; legs piceous, the tibiae and tarsi more or less obscure rufous. Surface lustre only moderately shining, the reticulation somewhat rough, meshes unequal and of irregular form, minute punctures very few, and when present within the meshes. Outline nearly perfectly continuous; prothorax rather broadly margined at sides; metasternum short between the mesocoxae and coxal plates, the distance between them being less than one-third the length of the latter. Protarsi of male only feebly incrassate, the anterior claw a little dilated toward the base, very nearly as in *seriatus* and many *lugens*. Length 9.8 to 11 mm.

One of our largest species and apparently not overly common in collections, though seemingly not rare within its limited range from Northern to Central California. It is known to me from Humboldt, Marin and Contra Costa Countries, and from Alma in the Santa Cruz Mountains. The type is from the "upper Sacramento River."

A. lugens Lec. Ann. Lyc. Nat. Hist. New York, V, 1851, p. 203.

suturalis Cr. Trans. Am. Ent. Soc. IV, 1873, p. 423.

var. *perplexus* Shp. On Dytiscidae, p. 498.

In general appearance similar to and almost precisely intermediate between the somewhat larger and broader *brevicornis* and the rather smaller and narrower *seriatus*. The color is black, often slightly aeneous, the small sublateral yellow spot of the elytra usually evident though often quite obscure, the antennae darker rufous or rufopiceous, the legs nearly black. The elytral reticulation is typically fine, slightly scabrous toward the sides and apex, the small unequal areolae each as a rule with a single minute puncture. Metasternum between mesocoxae and coxal plates much longer than in the allied species. Male protarsi moderately incrassate, the anterior claw varying from almost perfectly simple (as in the type) to more or less distinctly arcuately thickened toward the base, in the same fashion as in *seriatus* and *brevicornis*, there being some degree of modification except in rare instances. Length 8.3 to 9.5 mm.

Var. *perplexus* Shp.

Specimens from Northern California, Washington, Vancouver and British Columbia are, as a rule, less finely reticulate than in typical *lugens* from the more southern regions, and the form seems slightly more obtusely oval. They are the *perplexus* of Sharp. These merge by insensible gradations into typical *lugens*, such that a considerable proportion, more especially of California specimens, are neither typically one nor the other, but occupy the debatable ground between. In the series before me of what I judge to be typical *perplexus*, the length varies from 9 to 9.5 mm. In all males seen the basal portion of the anterior protarsal claw is a little thickened precisely as in the greater number of otherwise typical *lugens*, as well as intergrading examples.

Lugens—including *perplexus*—is an extremely common species in the far West, ranging from British Columbia to Lower California, and extending East to Nevada, Utah (St. George), Arizona (Williams; Chiricahua Mts.; Pinal Mts.), New Mexico (Cloudfcroft; Silver City;

Albuquerque; Santa Fé) and Colorado (Canon City; Colorado Springs).

Suturalis Cr., described from Nevada, differs in no appreciable way from typical *lugens*.

A. punctatus Melsh. Proc. Acad. Nat. Sci. Phila., II, 1846, p. 27.

Rather obtusely oval, quite strongly convex, rufopiceous, margins clearer rufous, surface usually distinctly aeneous; antennae, legs and epipleura rufous. Elytra minutely reticulate and with sparse uniformly distributed extremely fine punctules, the dorsal series of coarser punctures conspicuous but confused; prothorax with a few punctures at sides except at the front angles. Prosternal process elongate, gently evenly convex, finely margined, the tip moderately acuminate; metasternum rather short, its length between the middle coxae and coxal plate scarcely more than one-third the length of the latter; postero-apical angle of hind femora distinctly laminate; hind tibiae without series of coarse punctures along the inner margin. The inner spur of the hind tibia is very long in both sexes, exceeding very noticeably the length of the first tarsal joint, and in the male is thicker, more rapidly tapering at tip and more distinctly striate beneath than in the female. Protarsal claws of male a little shorter and stouter than in the female, the anterior one with a small basal angulation. Length 7 to 7.25 mm.

This species ranges along the Atlantic coast from Massachusetts (Nantucket) to Georgia. There are specimens from Staten Island and Anglesea, New Jersey, in the Sherman collection. It is lacking in the Washington, D. C. list but must occur there. Hamilton gives it in the Southwest Pennsylvania list, as does Wickham for Iowa, but the latter is probably in error, specimens sent me by Prof. Wickham proving to be *aeruginosus*.

A. aeruginosus Aubé, Spec. Gen. 1838, p. 298.

So greatly like the preceding species as to be almost inseparable except by means of the male sexual characters, as indicated in the table of species. In addition to the characters there set forth, it may be said that the middle tibiae of the present species are more parallel sided, with the inner fimbriate margin perceptibly sinuate, in the male, while in *punctatus* the tibia gradually widens from base to apex, the form being more triangular. In *aeruginosus* the posterior outline of the hind thighs is evidently concave, and the apical angle seems in consequence distinctly produced. This is more conspicuous in the male, but is also characteristic in less degree of the female, and with care offers a means of separating the two species when females alone are present, the femoral margin in *punctatus* being almost straight or only very slightly sinuate near the apical angle. The metasternum is even slightly narrower behind the middle coxa in *aeruginosus* than in *punctatus*. Length 7 to 7.75 mm.

Specimens in my collection bear labels Tyngsboro, Mass., Lakehurst, New Jersey and Southern Pines, North Carolina, and this probably indicates pretty accurately the range of the species in the Atlantic region. From the Mississippi Valley I have seen specimens from Highland Park (vicinity of Chicago) Illinois, in the Sherman collection, and from Iowa City, Iowa, in the Wickham collection.

In the long inner spur of the hind tibia and other crural characters *punctatus* and *aeruginosus* differ notably from all other known species of *Agabus*, so much so that Sharp assigned them to a separate group (Group 6) in his treatment of the genus.

A. triton new species.

Rather broadly oval, strongly convex, general color dark rufopiceous or castaneous, the margins more rufous, surface strongly shining in both sexes. Head piceous, epistoma and two vertex spots rufous. Prothorax with rufous sides, the disk broadly blackish. Elytra with the disk broadly rufopiceous or dark chestnut, becoming gradually paler at base and sides. Body beneath blackish, the abdomen medio-basally and the apices of the segments more or less rufous. Antennae, prosternum, epipleura and legs rufous, the femora, especially of the hind legs, often a little dusky. Entire upper surface finely and feebly reticulate, the elytral areolae small and irregular. The three series of elytral punctures are distinct but considerably confused, and there is a system of scattered minute punctures occupying the intersections of the network. The outline of the thorax and elytra is nearly continuous; the prosternal process is of moderate length, sub-compresso-carinate; the hind thighs are slightly produced at their apical angle and are almost destitute of the stiff bristle bearing erosion at the angle which is so generally and characteristically present in this genus; the hind tibiae have a series of coarse punctures along both the inner and outer margins. The four anterior tarsi of the male are moderately strongly incrassate and clothed beneath with glandular hairs which bear rather large palettes. The claws of the front tarsi (♂) are short, the posterior one regularly curved and acute at tip, the anterior one thickened and of sensibly uniform width from the basal dilation to the obtusely truncate apex. In the female the protarsal claws are simple and like those of the mesotarsi. Length 6.5 to 7.5 mm.; width 3.7 to 4.3 mm.

Described from a series of eight examples from Edmonton, Alberta (April 12, 1917—F. S. Carr) and Winnipeg, Manitoba (April 17, 1911—J. B. Wallis). The type, a male from the first named locality, is in the writer's collection.

This species bears a very striking general resemblance to *punctatus*, but is abundantly distinct in its greater convexity, compresso-convex prosternal process, inner margin of hind tibiae punctate, much shorter posterior tibial spurs and differently formed anterior protarsal claw of male.

A. punctulatus Aubé, Spec. Gen. 1838, p. 332

aeneolus Cr. Trans. Am. Ent. Soc. IV, 1873, p. 417.

Size very small, form evenly oval; prothorax piceous with paler side margins; elytra rufotestaceous or yellowish brown, the disk broadly more or less infusate and usually with distinct aeneous lustre; body beneath piceous, the antennae, legs and epipleura rufous. Surface rather finely reticulate, with numerous very fine punctures at the intersections of the network, the areolae variable in size and form. In the male the lustre is moderately shining, in the female quite dull, owing partly to the deeper sculpture, but more especially to a secondary system of minute reticulations. The areolae in the female are distinctly more longitudinal in the basal half of the elytra, not appreciably so in the male. The four

anterior tarsi of the male are distinctly incrassate, the glandular hairs beneath bearing minute palettes; the anterior protarsal claw is peculiarly toothed beneath, the proximal side of the tooth being parallel to, and the distal side perpendicular to the axis of the claw, the apex of the tooth either rectangular or a little acute, and about twice as distant from the base of the claw as from the tip. The prosternal process is more narrowly (subangularly) convex than in any of the preceding species. Length 5.8 to 6.5 mm.

A species of northern distribution ranging from New England to Manitoba and perhaps even further west. Specimens submitted by Mr. Frost bear the label "Saskatchewan?"

This and the next are our smallest species of *Agabus*. The present species is completely defined by its size, color, and the peculiar form of the anterior protarsal claw of the male. It is closely allied to the following species, which has hitherto been confused with it.

A. oblongulus new species.

Very closely allied to *punctulatus*, the color similarly aeneopiceous with paler margins, the elytra varying to entirely obscure brownish yellow; sculpture nearly identical, the females similarly opaque; form perceptibly more oblong, especially when series are compared; tooth of anterior protarsal claw of male acute and more nearly median in position. Length 5.5 to 6.3 mm.

The type in the writer's collection is a male from Corvallis, Oregon. I have also examples from Port Townsend, Washington, and have seen specimens from Spokane Falls, Washington (Wickham collection.)

A. semipunctatus Kby. Fauna Bor. Amer., Ins. 1837, p. 69.

stridulator Shp. On Dytiscidae, p. 509.

Moderately elongate, oblong oval; black, antennae rufous, legs dark rufous the femora and sometimes the tibiae darker. Surface moderately shining, without aeneous lustre; dorsal series of punctures of elytra conspicuous, confused; reticulation fine, irregular; minute punctures sparse, sometimes within the areolae, sometimes at their intersections. Side margins of prothorax narrow. Third ventral of male with several subparallel rather deep curved striae each side of the middle. Pro- and mesotarsi of male a little incrassate, anterior protarsal claw with an acute subbasal tooth. Length 5.5 to 6.7 mm.

A common species, occurring over a large part of British America (Newfoundland; Hudson Bay region; Manitoba; Alberta; Ottawa, Ontario) and through the northern United States from New England to Illinois (White Mts., New Hampshire; Tyngsboro, Mass.; Peekskill, New York; Arlington, New Jersey).

Kirby described from a unique female specimen, locality not stated. At my suggestion Mr. Arrow has kindly compared this type with the type series of *stridulator* Shp., and does not hesitate to pronounce them identical. For some unaccountable reason Sharp seems never to have examined Kirby's types though their presence in the British Museum would appear to make them easily accessible to him.

A. sharpi new species.

In general aspect almost an exact counterpart of *semipunctatus*. With males in hand it is most readily distinguished from the latter by the absence of the impressed curved striae of the third ventral segment. These striae need not be confused with the fine scratches present on the ventral surface of most if not all species of *Agabus*, the latter being notably finer, and on the third segment much more transverse in direction. It may be further noted that in the present species the tip of the tooth of the anterior protarsal claw in the male is less basal in position, being not much more distant from the apex than from the base of the claw. The side margin of the thorax is much broader than in *semipunctatus* and often more or less rufescent, while the meshes of the elytral reticulation are distinctly larger. In the great majority of females the elytral sculpture does not differ appreciably from that in the males, but in a few examples is much deeper and the surface lustre comparatively dull. Length 6.7 to 7.1 mm.

This is the species which Sharp interpreted as Kirby's *semipunctatus*, and I have now before me a specimen from the Sharp collection bearing this name label in his own hand. This specimen was collected at Grimsby, Ontario by Pettit. All other examples seen by me including the type, were taken at Winnipeg, Manitoba, by Mr. J. B. Wallis. Type in my own collection.

A. taeniolatus Harris, New Eng. Farm. VII, 1828, p. 164.

This easily recognizable species seems to require no description. It shares with *disintegratus* and *lineellus* the distinction of being the only gayly colored species in our fauna. In color and markings of the upper surface it is almost identical with *disintegratus*, but the dark elytral vittae are as a rule less distinctly green bronzed and often heavier than in the latter. The tabular characters are at all times sufficient for the separation of the two species, but it may be added that the form in *taeniolatus* is a little more broadly oval, the meshes of the elytral reticulation a little smaller and the minute elytral punctulation more evident, this being virtually wanting in the female of *disintegratus*, and almost imperceptible in the male. Length 7.5 to 8 mm.

Known to me from Massachusetts (Tyngsboro; Nantucket) to Virginia (Fredericksburg). Hamilton records it from southwestern Pennsylvania, and Dury from Cincinnati.

A. disintegratus Cr. Trans. Am. Ent. Soc. IV, 1873, p. 416.

Strikingly similar to *taeniolatus*, for a comparison with which see the tabular characters and remarks under the latter species. Length 7 to 7.8 mm.

A species of very wide distribution, occurring from Massachusetts through Ontario, Canada, to Washington State (Trout Lake) and Southern California (Pomona). It is rather common in New Jersey and Pennsylvania and occurs as far south at least as North Carolina. It is in the Iowa list and is known to me from Kentucky, St. Louis, Missouri, El Paso, Texas, and New Mexico (Ft. Wingate).

A. lineellus Lec. Proc. Acad. Nat. Sci. Phila. 1861, p. 340.

Form broadly oval, prothorax typically entirely testaceous, but varying to piceous

with the sides paler. Elytra yellow, each with four narrow black discal vittae and fragments or traces of one or two others external to these; the suture also extremely narrowly margined with black. Body beneath black; antennae, legs and epipleura rufous. Elytral reticulation rather lightly impressed, the meshes large, and each, as a rule, with one or two very fine punctures. Protarsal claws of male rather slender, the anterior one distinctly but obtusely angulate beneath at about the basal third. Length 7.5 mm.

This very rare species is represented in the LeConte collection by the unique type taken by Murray in California, precise locality not stated. Aside from the type I have seen only a single example collected by G. R. Pilate at Mills College, California, and sent me for identification by Mr. Dury, who retains a second specimen in his own cabinet.

A. austini Shp. On Dytiscidae, p. 516.

Form varying from oval to somewhat obovate; above brownish testaceous, the margins diffusely paler, at least in the darker specimens; surface shining, not or only slightly less so in the female; beneath piceous, prosternum and abdomen more or less paler, legs and antennae rufous. Elytral reticulation coarse, fine punctulation almost wanting. There is a minute obscure secondary system of reticulation visible only under considerable amplification. Pro- and mesotarsi of male narrowly dilated, the glandular hairs tipped with small rounded palettes; protarsal claws equal, elongate, nearly straight, feebly sinuate on their lower edge. Length 8.2 to 9 mm.

A rather common species in the Rocky Mountain and Plateau region, ranging from Idaho and New Mexico West to British Columbia, Eastern Washington and Eastern California (Truckee). There are specimens in the Sherman collection from Gaston, Northwest Oregon, which is its closest approach to the Pacific Coast known to me. The type is from British Columbia, but precise locality is not named.

A. strigulosus Cr. Trans. Am. Ent. Soc. IV, 1873, p. 422.

nanus Lec. Bull. Geol. Surv. IV, 1878, p. 452.

Narrowly oval; black, head and thorax slightly bronzed; elytra fuscous or brownish with margins paler; legs rufous, hind thighs more or less infuscate, the others rarely so. Elytral reticulation lightly impressed, the meshes large and unequal, with a minute secondary reticulate ground sculpture. Hind thighs without, or with at most only a short basal row of punctures along the inner margin. Pro- and mesotarsi distinctly incrassate in the male, the glandular hairs tipped with a dense mat of minute palettes anteriorly and with much larger ones in posterior half. Protarsal claws of male slender, feebly sinuate. Length 6.2 to 6.6 mm.

Crotch's type was from Lake Tahoe, California. Examples are known to me also from Corvallis and Gaston, Oregon; North Yakima, Washington (Sherman collection); Vancouver Island (Wickham); Terrace, British Columbia (Mrs. Hipplesey); Overland Lake, Boulder Co., Colorado (Rohwer). LeConte's type of *nanus* was from Florissant, Colorado, 8,000 feet.

A. ambiguus Say, Trans. Am. Phil. Soc. II, 1825, p. 96.

reticulatus Aubé. Spec. Gen. p. 355.

fimbriatus Lec. Ann. Lyc. Nat. Hist. N. Y. V, 1851, p. 214.

Oval, moderately convex, piceous, elytra brownish fuscous with the limb paler; antennae and legs rufous, the posterior ones often more or less infusate; epipleura piceous or fuscous, concolorous with the lower surface in fully colored specimens. Upper surface very conspicuously irregularly reticulate, the elytra with secondary minute reticulation or alutaceous sculpture, which is as a rule better defined in the female; minute elytral punctures virtually lacking. Hind tibiae with a series of a few punctures along the inner margin basally. Protarsi of male distinctly dilated and densely clothed beneath with glandular hairs which bear distinct palettes in apical half. Length 8 to 8.3 mm.

This is a common species in the Northeastern States. It ranges from Canada (Montreal) to Virginia (Warm Springs) and westward to Dakota (Brookings-Sherman collection) and Manitoba. The following additional specific localities are represented before me. New Hampshire (Randolph; Farmington); Massachusetts (Framingham); Pennsylvania (Chambersburg; Harrisburg; Bethlehem); Illinois (Vicinity of Chicago); Michigan (Marquette; Huron Mt. Club.)

Although not hitherto so recognized, I have no doubt whatever that this species, commonly known as *reticulatus* Aubé, is the true *ambiguus* of Say. Following his description, Say says of *ambiguus*, "it approaches very closely to *erythropterus*, but may be distinguished by its smaller size, less dilated form" etc. The present species does quite closely resemble *erythropterus*, differing therefrom in precisely the ways which Say indicates. Another highly significant statement made by Say is that the epipleura are black. They are so in *reticulatus* Aubé, but not in any of the other species (*infuscatus*, *discolor*, *congener*) with which *ambiguus* has been identified by later authors. Add to this the fact that *reticulatus* Aubé is a common species in Eastern Pennsylvania—the type locality of *ambiguus* and that *infuscatus* and *congener* and probably also *discolor* do not occur there, and the conclusion that *ambiguus* and *reticulatus* are one and the same species seems inevitable. By some oversight *fimbriatus* Lec. is made a synonym of *reticulatus* Kby in the Leng Check List. The latter is really synonymous with *arcticus* Payk.

A. erythropterus Say, Trans. Am. Phil. Soc. II, 1825, p. 95.

The large size, broad, rather convex form which tends to become somewhat obovate, especially in the female, coarsely reticulate elytra, the meshes becoming strongly longitudinal basally in the female, and the perfoliate protarsal claws in the male, make the recognition of this common species easy and certain. The color as well as the sculpture, except for the darker legs and modified elytral reticulation in the female, are practically the same as in *ambiguus*. Males, as a rule, are a little larger than the females. Length 8.5 to 9.5 mm.

This species occurs from Cape Breton (Boisdale) to the District of Columbia, and westward to Lake Superior. It is an abundant species throughout New England, New York and Pennsylvania. It is probable that Say described from Pennsylvania specimens, although he gives no locality.

A. lutosus Lec. Melsh. Cat. 1853, p. 31.

discolor || Lec. Ann. Lyc. Nat. Hist. N. Y. V, 1851, p. 204.

lecontei Cr. Trans. Am. Ent. Soc. IV, 1873, p. 417.

Head and thorax black, usually with distinct aeneous lustre; elytra yellowish brown, often with the disk more or less infuscate, sometimes with fuscous irroration; body beneath black, epipleura yellow; legs and antennae rufous, the femora often more or less piceous. Elytra in the male smooth and shining, but with a very fine and feeble reticulation, of which the meshes are irregular, some containing a minute puncture. In the female the reticulation is coarse and deep and the surface much duller, the meshes distinctly longitudinal baso-medially, and the apex, especially near the suture becomes much smoother. In the male the protarsi are very widely dilated, the glandular pubescence beneath bearing quite large palettes; anterior protarsal claw with a conspicuous median acute tooth. Length 7 to 8 mm.

Lutosus inhabits the Pacific coast region from Vancouver to Southern California, and next to *lugens* is the commonest species of *Agabus* within that area. It does not seem to extend to any distance east of the Sierra Nevadas, but I have seen specimens from Independence, California, on the western edge of the desert, and from Dalles, Oregon. The type was taken at San Francisco.

This species was described by LeConte in 1851 under the name *discolor*, but this name being preoccupied by Harris (1828) he changed it to *lutosus* in his Revision of the Melsheimer catalog in 1853. It would seem necessary to use the latter name notwithstanding the fact that LeConte later inadvertently applied it to another species. In 1873 Crotch gave it the name *lecontei*, and as such it has since been universally known.

A. griseipennis Lec. Smithson. Cont. Knowl. XI, 1859, p. 5.

Very similar in structure and general appearance to *lutosus*, with which it will probably be found confused in some collections. Males may be distinguished from *lutosus* by the tabular characters. Females of the two species are greatly alike and may not be separable with certainty in the absence of males. It may be said, however, that except for specimens taken at or near the western limit of its range, the locality label will prove a tolerably safe guide to identification. The dilation of the male tarsi reaches its maximum in these two species, and is even a little greater in *griseipennis* than in *lutosus*. Length 7.4 to 8.5 mm.

Griseipennis inhabits the Rocky Mountain and Plateau region, at the western limit of which it comes in contact with the territory occupied by *lutosus*. It is rare in collections, and when present is

scarcely ever recognized. The following localities are known to me. Wyoming (Fort Laramie—type); Montana (Kalispell—Wickham); New Mexico (Ft. Wingate—Sherman collection); Nevada (a male in the Sharp collection correctly referred); Humboldt Lake, Nevada (Wickham collection); Owens Lake, California (G. R. Pilate).

A. nigripalpis Sahlb. Sv. Vet. Ak. Handl. 17, 4, p. 56.

borealis Shp. On Dytiscidae, p. 513.

dissimilis Sahlb. i. litt.

Form elongate, more or less obovate, especially in the female; males shining, females sometimes as shining as the males, but usually duller, often quite opaque. Head, thorax, and body beneath, black; elytra varying from brown to fuscous, with side margins more or less paler, surface commonly with a distinct aeneous lustre; legs rufous, the femora darker, antennae with the outer joints apically infusate, last palpal joint almost entirely blackish. Elytra finely reticulate in the male, the meshes unequal basomedially, becoming rather smaller and nearly equal toward the sides and apex; minute punctulation sparse and extremely indistinct, the punctules sometimes within the meshes, sometimes at the intersections. In the female the reticulation is stronger, becoming gradually somewhat smoother apically. Length of metasternum between meso-coxae and coxal plates one-half the length of the latter. Pro- and mesotarsi quite strongly incrassate, the glandular hairs tipped with rather large oblong oval palettes. Protarsal claws of male somewhat elongate, slender, not much curved, the posterior one sensibly sinuate beneath. Length 6.5 to 6.8 mm.

The identification of the present species with the Siberian *nigripalpis* of Sahlberg is due I think to Sharp. This has been verified recently for me by Mr. Arrow, who writes that our Arctic American specimens are apparently identical with the type of *borealis* Sharp, which latter Sharp has stated in his monograph (p. 924) to be in his belief the same as *nigripalpis*. This is the species recorded under the name *longulus* Lec. in Packard's Labrador List.

I have seen examples from Stupart's Bay (Hudson Bay), and numerous specimens taken by the Canadian Arctic Expedition along the Arctic shores of British America and Alaska. In the report of the Canadian Arctic Expedition (Part E, Coleoptera) Mr. Sherman quotes the following localities from the material sent him for determination. Colville Mts., Wollaston Peninsula, Victoria Island; Bernard Harbor, N. W. T., and Demarcation Point, Barter Island, Collinson Point and Teller, all in Alaska. He also gives Cape Digges, Hudson Strait.

This species is quite variable in color, and on examination I am quite convinced that the two specimens from Collinson Point which Mr. Sherman refers to *obsoletus* Lec., are only a color form of the present species with yellowish brown elytra.

A. morosus Lec. Ann. Lyc. Nat. Hist. N. Y., V, 1851, p. 204.

obsoletus Lec. Jour. Acad. Nat. Sci. Phila., (2), IV, 1858, p. 15.

fossiger Mots. Bull. Mosc. III, 1859, p. 170.

Head and thorax black, the former with the usual vertex spots, the latter with the lateral marginal bead only, obscure rufous; elytra dark brown or brownish fuscous, the margins more dilute; body beneath including epipleura, black or piceous; labrum, antennae and four anterior legs rufous, the thighs more or less infuscate, hind legs darker. Surface strongly shining and obsoletely irregularly reticulate in the male; in the female more coarsely and deeply reticulate and duller, the apical fourth (more or less) of the elytra rather abruptly much smoother; minute punctulation scarcely detectable. Prosternal process rather large, flattened or feebly convex basally, more convex and finely acuminate apically. Distance between meso-coxae and coxal plates distinctly less than half the length of the latter. Pro- and mesotarsi of male strongly dilated, the glandular hairs bearing moderate sized palettes; protarsal claws elongate, sinuate beneath, their upper edges straight or nearly so for three-fourths their length. Length 6.9 to 8 mm.

This species occurs throughout California, the following localities being represented in my series:—San Diego; Riverside; Pomona; Long Beach; San Bernardino Mts., 7500 feet; Owens Lake; San Francisco; Humboldt County. The type is a female from San Francisco.

I have felt constrained to suppress *obsoletus* Lec. as entirely synonymous with the present species. It was described from a single male specimen taken at San Diego, which harmonizes completely with males of *morosus* from farther north. The type of *obsoletus* carries no locality label other than the gold disk which signifies California. There are however in the LeConte series three other examples—all ♀'s—with gold disks, one of which bears an additional "Mendocino" label. Two of these are typical *morosus* females; the third however is much smoother, and moreover differs in several slight respects from the other two ♀'s and from the ♂ type. Crotch's statement that the female in *obsoletus* is shining is evidently based on this last specimen, but it is certain that this was a later acquisition and there is nothing to indicate when or where it was taken or to connect it with the male type. On the other hand I have perfectly typical females of the *morosus* type from San Diego the type locality of *obsoletus*, and have no doubt of the correctness of my conclusion that these are one and the same species. Among certain European species of *Agabus* there are well established instances of dimorphism in the sculpture of the females; it is therefore possible that the smooth female in the LeConte series may be a variation of this sort.

A. ancillus new species.

Very closely related to *morosus*, but of smaller size and a little narrower, the form evenly oblong oval—often slightly widened behind in females of *morosus*—the elytra paler brown or yellowish brown, the disk less deeply infuscate;

epipleura with pale outer margin; legs almost entirely rufous, the femoral infuscation feeble; otherwise as in *morosus*. Length 6.5 to 6.8 mm.

Described from a good series of specimens (Sherman collection) from Gaston and Corvallis, Oregon. The type is a male from the first named locality, and is in my own collection.

A. obliteratus Lec. Smithson. Cont. Knowl. XI, 1859, p. 5.

Again very closely related to *morosus*, and also to *ancillus*. Similar in size to the former, but more evenly oval, more narrowed in front, the prothorax consequently appreciably smaller. General color and sculpture nearly as in *morosus*, the elytra, however, are typically uniformly yellow brown, and as a rule are rather paler than in that species; epipleura piceous with pale outer margin, as in *ancillus*. Sexual characters as in *morosus* and *ancillus*. Length 7 to 8 mm.

Occurs in the Rocky Mountain region from Wyoming to New Mexico. I have seen examples from Ft. Laramie (type) and Cheyenne, Wyoming; Gunnison County, Ouray, Georgetown, Salida, Denver, and Buena Vista, Colorado; Ft. Wingate and Jemez Springs, New Mexico.

A. congener Payk. Fauna Suecica I, 1798, p. 214.

Subelongate oval, black, elytra brownish fuscous with dilute margins, upper surface usually feebly aeneous; epipleura and apices of ventral segments pale; antennae rufous with outer joints partially infuscate; last joints of palpi more or less dusky or blackish except at base; legs rufous, the femora largely piceous. Elytral reticulation rather fine but quite distinct under moderate power, usually appreciably stronger in the female, the meshes irregular and unequal throughout; minute punctules sparse and occurring for the most part within the areolae, but only detectable upon close observation. Metasternal length between meso-coxae and coxal plates unusually great, being evidently more than half the length of the latter. Male pro- and mesotarsi rather feebly dilated, the protarsal claws somewhat elongate, slender, little curved except at tip, the hinder one a little sinuate beneath. Length 7.5 to 8.4 mm.

This species is evidently abundant in Labrador, judging from the numerous specimens from several localities received by Mr. Sherman. It is also common according to Sherman in the small lakes above the tree line in the White Mts of New Hampshire. A single female from Ruby, Alaska (Kusche) in my own collection is here referred with some confidence. According to Sharp, *congener* is in Europe a wide spread "arctic, alpine and sub-alpine species," and is there said to vary in color, size and form, and extremely so in the sculpture of the female. No very great variation of this sort has been observed among the American representatives of the species.

In color and other general features *congener* is typical of a group of species between which it is more than usually difficult to discriminate. These species have in consequence been badly muddled by collectors and systematists alike. For instance:—Zimmermann, in his recent paper on "Die Schwimmkäfer des Entom. Mus. in Berlin-Dahlem"

places in synonymy with *congener*,—*discolor* Harr., *ambiguus* Say, *fossiger* Mots., *morosus* Lec., *inscriptus* Cr. and *phaeopterus* Kby. As a matter of fact not one of these species is the same as *congener*, and they are for the most part mutually distinct among themselves.

A. approximatus new species.

Evenly oval, a little more broadly so than in *congener*, with which it is closely allied. In all specimens seen the elytra are yellowish brown, the disk much less deeply infuscate than is the rule in *congener*; elytral sculpture and lustre not appreciably different in the sexes. The coxal plates are slightly larger than in *congener*, their distance from the middle coxae being about half their own length, this distance slightly greater in *congener*; other differences as indicated in the table. The male tarsi and tarsal claws are as in *congener*. Length 7 to 8 mm.

Described from a considerable series of specimens in Mr. Sherman's collection bearing label "Horsefly Pk. divide, Placerville Rd. San Mig County, Colorado, 8,000 feet, July 13, 1885," and were taken I think by either Mr. Hayward or Mr. Bowditch. The type is a male in my own collection. A single male from Florissant Colorado (Cockerell) is also assigned here. Specimens have more recently been received from Mr. Knaus who took them at "The Mammoth, Utah, top of Parowan Mts., 10,000 feet."

The present species is also very close to *inscriptus* and *discolor*, but is quite surely distinct by its less minute and better defined elytral reticulation, and its narrow more strongly convex prosternal process; the coxal plates approach the middle coxal cavities much more closely in *discolor*.

A. discolor Harris, N. E. Farmer VII, 1828, p. 164.

In form, color and general structure, closely similar to *congener*, but separable with certainty by the larger coxal plates, which at their anterior limits are less than half their own length from the mesocoxae. The apices of the antennal joints, and of the terminal joints of the palpi are as a rule without or with but faint trace of infuscation (distinctly dusky or blackish in *congener*); the elytral reticulation is finer and more obsolete, the areolae less conspicuously unequal, and only distinctly so in the baso-sutural region, becoming nearly equal toward the sides and apex. The size averages quite distinctly smaller than in *congener*, the larger specimens of *discolor* being comparable in this respect with the smaller examples of the latter, and the elytra are oftener of a clearer and more uniform yellow brown color, although as described by Harris they are typically "fuscous" with "margin and base pale." The male tarsi and tarsal claws are very nearly as described of *congener*. Length 6.5 to 7.5 mm.

This species ranges from New England to Manitoba. The following localities have been noted. Wales, Maine (Frost); Vermont (Adams—see below); Hopkinton, Mass. (Frost); Cornwall and Milford, Connecticut (Chamberlain); Warren and Washington Counties, New York (Sherman); Lake Memphremagog, Canada (Dimmock); Bayfield, Wisconsin (Wickham); Isle Royal, Lake Superior (Wickham);

Williston, North Dakota (Wickham); Mile 332, Hudson Bay R. R. (Wallis).

Under the number "400," the original of the description of "*Colymbetes discolor*" is referred to in the Harris Note Book as having been taken "in a pond May 25, 1826," undoubtedly in the vicinity of the author's home in Milton, Mass. This specimen has disappeared from the Harris collection and is probably no longer extant. Under the same number (400) the Note Book mentions a second example taken by Adams June 15, 1826 in Vermont. This specimen is now in the LeConte collection and as it is undoubtedly one of the five examples upon which Harris based his description I am accepting it as a true representative of the species. There are only two known species occurring in Eastern Massachusetts to which Harris' description applies, viz. the present species and the *subfuscatus* of Sharp. We can never be absolutely sure which of these Harris had in hand but as he says in his description "nails alike in both sexes," and this applies rather better to the present species (though not strictly true of either) than to *subfuscatus*, I feel quite confident that this course is the correct one.

A. inscriptus Cr. Trans. Am. Ent. Soc. IV, 1873, p. 422.

Extremely close to *discolor*, and I am unable to give any other means of separating them than those named in the table. Even here a rather nice discrimination is necessary, though in practice the locality label will usually aid materially. I observe that in the majority of specimens of *discolor* examined, the sides of the pronotum are very narrowly rufous or rufescent within the marginal bead, while none of the specimens of *inscriptus* at hand show this. It is possible that this character may prove to have some value in a confirmatory way. Length 6.4 to 7.3 mm.

Crotch's type was from Labrador. According to Mr. Sherman* "it is rather common at Hermit Lake, Mt. Washington (3,700 feet) but is seldom found above the tree line." I have seen an example from Sudbury, Ontario (Can. Nat. collection) and have two examples from mile 332, Hudson Bay R. R. (Wallis) which I refer here. Mr. Wallis also took *discolor* in the same locality.

A. canadensis new species.

Of the same general appearance as *discolor*, the sides of the thorax, however, always with well defined pale margins, the marginal bead narrower, the elytral reticulations minute and subequal throughout; the very fine punctules more numerous and more easily discernible than in *discolor*. The coxal plates are nearly as in *discolor*, their distance from the middle coxae being rather less than half their own length. Hind tibiae more or less punctate along the inner margin in basal half or two-thirds. These punctures vary from only one or two to five or six in number: they are as a rule entirely wanting in *discolor*. Protarsal claws

*A List of Labrador Coleoptera. Jour. N. Y. Ent. Soc. XVIII, p. 185.

of male both evidently sinuate, the anterior one more curved apically. Length 6.7 to 7.7 mm.; width 3.8 to 4.2 mm.

Of this species I have seen a good series collected by Mr. J. B. Wallis at Winnipeg and Aweme, Manitoba. There is also before me one example labeled "East Ontario." The type is a male from Aweme, and is in the writer's collection.

A. subfuscatus Shp. On Dytiscidae, p. 514.

Of the same type as the several preceding species, but differing from them by the very minute and everywhere similar and virtually equal areolae of the elytral reticulation. The minute punctules are evenly distributed over the elytra and are more easily discernible than in the species mentioned, each punctule occupying the center of one of the minute areolae, which it so nearly fills as to preclude the occurrence of a second punctule in the same area. The four anterior tarsi of the male are, as in the preceding species, but little dilated, but the protarsal claws are here more noticeably modified, the inner edge of the anterior claw being a little sinuate, while that of the posterior claw is broadly, obtusely, but perceptibly angulate at the apical third, when observed from the proper view point. This slight angulation of the posterior claw was overlooked by Sharp, but it is obvious enough on careful inspection and at once distinguishes the present species from the numerous similar ones which are likely to be confused with it. The elytra are typically broadly infuscate with paler margins, but are sometimes of a uniform brownish yellow tint. Length 7.3 to 8 mm.

The type locality is "Massachusetts." In the series before me the following localities are represented.—"New Hampshire;" Lake of the Clouds, Mt. Washington, New Hampshire; Massachusetts (Tyngsboro and Nantucket); Connecticut (Orange); Quebec (St. Jean); Ontario (Toronto, Ottawa and Belville); Michigan (Agricultural College); Illinois (Liebeck collection).

A. phaeopterus Kirby. Fauna Bor. Amer., Ins., 1837, p. 70.

This species of Kirby has never been certainly recognized by subsequent writers, though its identity with *discolor*, *ambiguus*, *congener* and perhaps other species has been suggested at various times. Thanks to Mr. Arrow I have been privileged to study one of Kirby's two original specimens, and am thus able to fix its position in our series. The meshes of the elytral reticulation are minute and regular as in *subfuscatus* and *bicolor*, with which it must be closely associated. The minute punctulation of the elytra is precisely as in *subfuscatus*, but the size is smaller than in that species, and the protarsal claws of the male are less modified, agreeing very nearly in this respect with *congener*, *discolor* and *inscriptus*. The elytra in all specimens seen show very little discal infuscation, the color being nearly uniformly brown or yellowish brown. Length 6.5 to 7.3 mm.

Kirby's type is from the region west of Hudson Bay "in latitude 54°." Precisely or closely similar examples have been seen from Bayfield, Wisconsin (Wickham); Marquette, Michigan (Sherman); Duluth, Minn.; Winnipeg; mile 332 Hudson Bay R. R., Manitoba (Wallis); Edmonton, Alberta (Carr).

A. bicolor Kby. Faun. Bor. Am. IV, 1837, p. 70.

mutus Shp. On Dytiscidae, 1882, p. 513.

Very close to *phaeopterus* in size, sculpture and structure, but easily separated by its color as indicated in the table. The coxal plates are large, the distance between them and the middle coxal cavities being even a little less than in *phaeopterus*, and quite evidently less than in *subfuscatus*. In some examples there is a fairly well developed series of punctures along the inner margin of the hind tibiae, these being almost or quite lacking in all specimens of *phaeopterus* examined, but the character is a variable one and must be used with caution. Length 6.8 to 8 mm.

Kirby described *bicolor* from a single specimen taken in British America "in latitude 54°." I have not seen the type, but the description, so far as it goes, agrees so well with Sharp's *mutus*, described from Hudson's Bay, that I requested Mr. Arrow to carefully compare the two types. He has done this and writes me that they appear to be in all respects identical. For a cotype of *mutus* from the Sharp collection I am indebted to Mr. Arrow; there is also before me an example taken by Mr. Wallis at Mile 214 Hudson Bay R. R. and three examples (Sherman collection) collected by Mr. F. S. Carr at Edmonton, Alberta, which seem to be the same thing.

A. confinis Gyll. Insecta Suecica I, 1808, p. 511.

ovoideus Cr. Tr. Am. Ent. Soc. IV, 1873, p. 418.

longulus Lec. Proc. Am. Phil. Soc. XVII, 1878, p. 596.

This Northern European species seems to be rather rare with us and I have seen but few specimens in our collections. The color is of the *congener* type, the very minute and regular elytral reticulation and extremely fine punctulation are nearly as in the four preceding species. The size is greater than in any of its nearer allies, but the species is most readily recognized by the form of the prosternal process, which is strongly laterally compressed so as to be acutely carinate along the middle. *Infuscatus* possesses nearly the same structure, but is readily separated by the rugose intralinear area of the hind coxae, as well as its smaller size and commonly fusco-irrorate elytra. Length 8.8 to 9 mm.

This species occurs in the latitude of our Canadian border. The three examples before me bear labels, Bayfield, Wisconsin (Wickham) and Duluth, Minnesota. LeConte's type of *longulus*, from Lake Superior, is absolutely identical.

A. infuscatus Aubé, Spec. Gen. 1838, p. 330.

The acutely carinate prosternal process, and rugose intralinear area of the hind coxae, taken together, are sufficient for the identification of this species. The color is in general of the *congener* type, but the elytra are of a rather duller brownish yellow or brownish gray, with the infuscation very often taking the form of a dense irroration or nebulosity such as is rather frequently seen in *lutosus*, and occasionally elsewhere. The sides of the thorax are pale in all specimens seen. The elytral reticulation is minute and very regular and without fine punctulation. The male protarsi are quite strongly incrassate, the protarsal

claws a little more elongate and less curved than in the female and barely perceptibly sinuate beneath. Length 6.5 to 8 mm.

Labrador; Ungava Bay; Hudson Bay R. R., Manitoba (Wallis).

The identity of this species is based on typical specimens sent to Mr. Sherman by Oberthür.

A. arcticus Payk. Fauna Suecica, 1798, p. 201.

reticulatus Kby. Faun. Bor. Amer. Ins. 1837, p. 71.

subfasciatus Lec. Smithson, Misc. Coll. VI (1863-1866), p. 17.

Narrowly oval, or a little obovate; above fuscous, head in front, thorax with sides and transverse median fascia (often interrupted at middle) and side margins of elytra, yellow. Elytra rather coarsely and deeply irregularly reticulate in both sexes, the lustre rather dull. The pro- and mesotarsi of the male are strongly incrassate, with very large nearly circular palettes beneath; the anterior protarsal claw angularly dilated before the base, the posterior one just perceptibly sinuate. The flat, slightly longitudinally concave prosternal process, and the sinuate front angles of the thorax in the female are characteristic. Length 6 to 7.5 mm.

This species is very abundant in Labrador. It is widely dispersed in northern Europe and Arctic Siberia, and may perhaps occur elsewhere in Boreal America.

A. ontarionis new species.

Size large, oval, outline in profile slightly gibbous, the highest point of the convexity being a little in advance of the middle. Head and thorax piceous, the latter with the sides narrowly rufescent; elytra dark brown or brownish piceous with sides diffusely paler; surface very finely irregularly reticulate basomedially, the areolae becoming nearly equal at sides and apex; dorsal series of punctures fine and inconspicuous; minute punctulation wanting. Prosternal process narrow, angulate in cross section; post-coxal length of metasternum less than half that of the coxal plates; hind tibiae with a row of punctures along the inner margin. Antennae and legs rufous, femora a little darker. Pro- and mesotarsi of male widely dilated, glandular hairs with moderate oval palettes; protarsal claws elongate and similarly sinuate beneath. Length 10 to 10.2 mm.

Bellville, Ontario (type); Makinak, Manitoba.

Described from three examples, all males, submitted by Mr. Sherman. Type in my own collection.

This is one of our largest species. In general aspect it resembles *erythropterus*, but is larger, very much more finely reticulate and with different male claws.

A. ajax new species.

Broadly oval, testaceous or brownish testaceous; head, prothorax and body beneath usually somewhat more rufous; head darker posteriorly, disk of prothorax with rather vague transverse median darker fascia. Antennae testaceous with at most the tips lightly infusate; terminal joints of palpi infusate apically. Head and thorax moderately irregularly reticulate; elytra strongly minutely reticulate, the meshes nearly equal; minute punctulation lacking; the usual coarser irregular serial punctures not very well defined. Prosternal process small, acutely com-

presso-carinate; middle coxae narrowly separated; metasternal wings rather narrow externally, their width between the mesocoxae and coxal plates about one-third, the length of the latter. Hind tibiae with a row of punctures along the inner margin. Pro- and mesotarsi very broadly dilated, the fourth joint barely half as wide as the third; protarsal claws of male elongate, nearly straight and slightly sinuate beneath; claw joint dentate beneath. The four anterior tarsi are furnished beneath with extremely large circular palettes, which appear to rest directly on the derm or in part to be supported on very short pedicels. Length 9.2 to 10 mm.; width 5.3 to 5.7 mm.

The type, in my own collection, is a male from Waghorn, Alberta, from which locality I have seen a considerable series, the greater number in Mr. Sherman's collection. A series of specimens (Sherman collection) from West St. Modest, Labrador, appear to be identical in every respect but are much smaller, being barely 8 mm. in length.

A fine big species which bears considerable resemblance to the European *fuscipennis*, with which it would be associated in Sharp's Group 19, but it may at once be separated from that species and from all others in our fauna by the last protarsal joint dentate beneath in the male.

A. coxalis Shp. On Dytiscidae, 1882, p. 535.

Broadly oval; head and thorax flavotestaceous, the former marked with black posteriorly, the latter with vague dusky median transverse divided spot, sometimes wanting; elytra fuscotestaceous, the margins yellowish; body beneath testaceous varied with blackish; legs and antennae flavo- or rufotestaceous. Elytra minutely regularly reticulate, dorsal series of punctures sub-obsolete. Prosternal process angulately convex; metasternal length between middle coxae and coxal plates much less than half the length of the latter. Pro- and mesotarsi of male broadly dilated and with large palettes beneath; anterior protarsal claw very short and rather stout, posterior claw slender, rather more than twice as long, and a little sinuate beneath. Length 8.2 to 8.3 mm.

Two specimens are before me, collected and donated by W. S. McAlpine, who took them at Homer, Alaska, August 7, 1911.

Sharp described this species from Eastern Siberia (Angara) and Lapland. It has not before been recorded from North America. *Coxalis* bears a general resemblance to *ajar*, especially the smaller Labrador form, but is easily separable by the male tarsal characters.

A. anthracinus Mann. Bull. Mosc. 1852, II, p. 304.

? *scapularis* Mann. l. c. p. 303.

Moderately elongate oval; black, head and thorax aenescent, elytra scarcely so; marginal bead of thorax and sides of elytra at the humeri more or less vaguely rufescent. Surface only moderately shining, the reticulation coarse, deep, and irregular, the meshes as large on the elytra as on the thorax. Antennae rufous; legs dark rufous, the femora usually darker. Male tarsi strongly incrassate and bearing beneath large circular palettes; protarsal claws of male somewhat elongate, little curved except at tip, the anterior a little less slender and scarcely sinuate beneath, the posterior lightly sinuate. Length 6.8 to 8 mm.

This common northern species ranges entirely across the continent from Newfoundland to Alaska. From the intermediate region there are specimens before me or known to me from the White Mts., New Hampshire; Tyngsboro and Forest Hills (near Boston) Mass.; Marquette, Michigan; Three Lakes, Wisconsin; Mile 214, Hudson Bay R. R., Manitoba; Edmonton, Alberta; Virginia River, Utah; McBride and Frazer River, British Columbia. Mannerheim's type was from Sitka, as was also the type of his *scapularis*, which is without much doubt identical.

A. nigroaeneus Er. Kaf. Mark. Brand., 1837, I, p. 157.

Erichsoni G. & H. Cat. Col. 1868, II, p. 454.

lutosus Cr. Tr. Am. Ent. Soc. 1873, IV, p. 419.

Size large, oblong-oval; black, the margins sometimes very narrowly and obscurely ferruginous; antennae, palpi and anterior legs rufous, middle and hind legs darker rufous or piceous. Elytra strongly irregularly reticulate, the meshes of moderate size and having a secondary reticulato-alutaceous sculpture, more distinct toward the apex; dorsal series of punctures well marked, minute punctuation nearly lacking. Prosternal process short, angularly convex; metasternal sulcus rudimentary; metasternum between meso-coxae and coxal plates longer than half the length of the latter; apical ventral of male obliquely longitudinally strigose each side of the middle. Pro- and mesotarsi of male distinctly incrassate, the palettes of the glandular pubescence elongate, small and of oblong form; protarsal claws of male of moderate length, the anterior one thickened basally, the posterior one more slender but more noticeably sinuate beneath. Length 9.3 to 11.1 mm.

One of our largest species and of wide northerly distribution, occurring from Labrador and the New England States to British Columbia.

A. confertus Lec. Proc. Acad. Nat. Sci. Phila. 1861, p. 340.

walsinghami Cr. Tr. Am. Ent. Soc. IV, 1873, p. 419.

Evenly oblong-oval; black, margins not or scarcely paler, elytra with a small elongate sublateral yellow spot, sometimes quite obscure, but present in all specimens examined; antennae and legs rufous, the latter often darker in part. Elytra lightly reticulate, the meshes rather large, irregular throughout, with a secondary micro-reticulate sculpture, most distinct toward sides and apex; minute punctules within the thoracic meshes, but for the most part at the intersections of the reticulating lines on the elytra. Prosternum angularly convex in cross section; metasternal sulcus very short, oblique and rudimentary. Pro- and mesotarsi of male distinctly incrassate; the protarsal claws both sinuate beneath, the anterior one a little more noticeably so. Length 8 to 8.5 mm.

This species occurs on the Pacific Coast from Southern California (Claremont) to Vancouver, a large majority of the specimens seen being from Northern California and Oregon. LeConte's type was from Pont Reyes on the California coast just north of San Francisco.

Confertus superficially looks a good deal like *lugens*, which occurs

in the same region; the latter however has a larger and flatter prosternal process, a normally developed metasternal sulcus and a deeper elytral reticulation, without the secondary ground sculpture.

A. gagates Aubé, Spec. Gen. 1838, p. 306.

Of moderately large size; broadly oval, black, aenescent, strongly shining in both sexes; front of head and side margins of thorax rufescent; side margins of elytra sometimes feebly so; beneath piceous or rufopiceous, legs and antennae rufous. Elytral reticulation lightly impressed, the meshes irregular throughout, minute punctules occurring almost entirely at the intersections of the reticulating lines. There is a very fine minute secondary reticulation not easily visible on the disk, but detectable towards the sides and apex. Prosternal process rather short and broad, steeply roof shaped. Pro- and mesotarsi of male moderately incrassate, the palettes at tips of glandular hairs very small or obsolete; protarsal claws slender, not longer than in the female, the posterior one slightly sinuate beneath. Length 8 to 9.2 mm.

This is one of the commonest of the New England species and ranges as far south as North Carolina ("L. Ellis"). I have seen specimens from South Haven, Michigan in Mr. Sherman's collection, and Sudbury, Ontario (Canadian Nat. collection), and LeConte long ago recorded the species from Lake Superior. It is not given in either the Western Pennsylvania, Cincinnati or Iowa Lists.

A. tristis Aubé, Spec. Gen. 1838, p. 356.

dubius Mann. Bull. Mosc. XVI, 1843, p. 221.

? *subopacus* Mann. Bull. Mosc. XXVI, 1853, p. 157.

? *atratus* Mann. Bull. Mosc. XXVI, 1853, p. 157.

A large species of elongate oval form, varying greatly in color from yellowish brown through various shades of brown to almost black, with or without paler lateral margins. The thorax varies from testaceous with a median transverse brownish discal fascia to entirely black, the intermediate forms having the lateral and apical margins, or the lateral margins alone more or less paler. Body beneath piceous varied with rufous; labrum, two vertex spots, antennae, palpi and legs rufous; the outer joints of the antennae, terminal joints of palpi, and posterior legs more or less dusky or infuscate. The primary reticulation of the upper surface is rather coarse, the areolae of the elytra large and irregular, with a tendency in the females to become obliquely longitudinal in the basal half. Length $9\frac{1}{2}$ to $10\frac{1}{2}$ mm.

This is strictly a northern or high mountain species, and occurs from the Aleutian Islands through the Alaskan Peninsula to British Columbia and the high Sierras of California (Lake Tahoe fide Crotch; Mt. Kaiser, 10,000 feet, Blaisdell). It is known to me also from high altitudes in Colorado and New Mexico, Lake Superior, the White Mts. of New Hampshire, and Labrador, while Hamilton records it from Arctic Siberia.

The anterior protarsal claw of the male has at its base a more or less prominent angulation, feeblest in the Alaskan representatives and most

developed in those from California and New Mexico; I have however been unable to correlate it with other variations in a way to define any well marked races.

A. leptapsis Lec. Proc. Am. Phil. Soc. XVII, 1878, p. 596.

Allied in a general way to *tristis*, but somewhat smaller and more narrowed in front, the form in consequence being more regularly oval. The color above is black or piceous, the lateral margins and epipleura not or only just perceptibly paler. Antennae, palpi and body beneath nearly as in *tristis*. In the male the surface is shining and moderately coarsely irregularly reticulate, the areolae sub-elongate baso-medially; in the female the elytra are densely strigoso-reticulate and dull, the areolae very elongate or sublinear throughout. Metasternal length between the meso-coxae and coxal plates evidently greater than half the length of the latter, while in *tristis* it is rather less than half the length of the coxal plates. In the male the four anterior tarsi are moderately dilated, but in the single male seen, the tarsal claws are missing so that it is impossible to say if they are furnished with a basal tooth or angulation as in *tristis*. Length 9.5 to 9.9 mm.

LeConte's unique type of this very rare species is a female from Marquette, Michigan. Aside from this I have seen only a single pair from Sudbury, Ontario, the male in the Canadian National collection, the female in my own collection.

A. discors Lec. Proc. Acad. Nat. Sci. Phila. 1861, p. 341.

Oblong oval, body deep black above and beneath, epipleurae piceous brown; antennae and legs dark rufous to rufopiceous. Male shining, female opaque, the elytra in both sexes longitudinally strigoso-reticulate. Lateral margins of thorax wide. Metasternum short; intercoxal groove short, rudimentary; last ventral strigose each side of the middle in the male, as in nigroaeneus. Male pro- and mesotarsi distinctly incrassate, the protarsal claws elongate and sinuate beneath, the anterior one slightly stouter. Length 10 to 10.7 mm.

This very distinct species, one of the largest in our fauna, is most often taken in Oregon and Washington, but I have seen specimens from as far north as Vancouver, and one example in the Roberts collection is labeled "California." It seems to be rather common at Corvallis, Oregon. LeConte's type was from "Wash. Terr."

A. clavatus Lec. Smithson. Cont. to Knowl. XI, 1859, p. 4.

Elongate oval, brownish yellow, margins of elytra a little paler, the head and prothorax clearer rufotestaceous; abdomen darker, varied with rufopiceous; antennae, palpi and legs rufous, the outer joints of the antennae and the terminal joints of palpi in apical half, piceous. Elytra very finely and regularly reticulate, with sparse minute punctulation evenly distributed. Prosternum compresso-carinate; metasternal wings narrow, sublinear externally; coxal plates strongly developed, angulate at their anterior limits, hind tibiae with or without a marginal series of punctures.

Male characters: antennae compressed and dilated apically, the last five joints forming a distinct though gradually formed club, joints 8-11 excavated basally beneath; pro- and mesotarsi moderately incrassate furnished beneath with mod-

erate sized palettes; protarsal claws mutually similar, a little straighter and feebly sinuate beneath. Length 7.5 to 7.8 mm.

Specimens before me bear labels, Vernon, British Columbia (Wickham collection); Edmonton, Alberta (Carr); Piquitenay River and Mile 214 Hudson Bay R. R., Manitoba (Wallis).

LeConte's type was from the "Loup Fork of the Platte River," Nebraska.

Carrhydrus

New Genus (tribe Agabini)

Of the general aspect of our large species of *Ilybius*; broadly evenly oval, the outline continuous. Antennae attaining the hind angles of the thorax, the intermediate joints broader and somewhat compressed in the male. Maxillary palpi normal; penultimate joint of labial palpi strongly dilated apically, the distal half having somewhat the form of a triangular prism with concave faces. Prothorax narrowly margined at sides, base broadly feebly lobed at middle; upper surface minutely reticulate. Prosternum strongly carinate throughout, the intercoxal process narrow, gradually finely acuminate at tip; mesosternum deeply abruptly channeled at summit; metasternum deeply grooved between the coxae. Coxal plates strongly sinuate on their inner margin and distant by less than one third of their own length from the middle coxae; metasternal wings narrowly triangular. Hind coxal processes thickened, rather strongly produced and deflexed away from the abdominal surface, their tips narrowly separated. Legs short and stout, all strongly sexually modified, the basal joint of middle tarsi of male suborbicular and extremely large; hind thighs with row of bristles along the posterior margin at apical angle; joints of posterior tarsi not lobed at tip, the terminal joint but little shorter than the two preceding united, its claws very unequal.

C. crassipes new species.

Male. Broadly elliptic oval, rather strongly convex, black, feebly shining, the side margins obscurely rufescent. Head with labrum and two vertex spots dull rufous. Antennae, palpi, legs and prosternum dark rufous to rufopiceous, trunk beneath nearly black. Antennae rather stout, gradually incrassate medially, joints 6-8 widest. Prothorax two-thirds wider than long, sides broadly evenly arcuate, surface very minutely irregularly reticulate; elytra equally minutely but very regularly reticulate, much as in certain species of *Agabus* (*subfuscatus*, *phaeopterus*, etc.) and with an extremely fine punctulation in addition to the somewhat coarser but still very fine irregular dorsal series of punctures. Body beneath finely strigose as in *Ilybius*. Front thighs stout, the middle ones still more strongly incrassate; front and middle tibiae stout, subtriangular, the former sinuately expanded apically, the latter with the external margin straight and much longer than the inner. Front tarsi with the basal three joints broadly

dilated, densely clothed beneath with glandular hairs bearing small rounded palettes, fourth joint scarcely wider than the fifth, which is nearly as long as all those preceding; claws equally elongate, the anterior one nearly straight and feebly sinuate, the posterior a little stouter and slightly curved. Middle tarsi more strongly modified, the basal joint greatly developed, convex above, concave beneath, the basal three joints densely clothed beneath as before. Hind tibiae parallel sided, slightly arcuate, with a dense fringe of erect hairs along the entire length of their inner margin, the basal joint of the tarsi similarly clothed, the following joints with shorter erect hair beneath, most evident on the terminal joint; inner claw barely half the length of the outer. Length 13.3 mm.; width 7.4 mm.

The unique type, now in my own collection, was sent me by Mr. F. S. Carr, who took it at Edmonton, Alberta, June 14, 1916, "in a small stream clinging to a straw." Mr. Carr writes that he has "searched many miles and acres of ponds and sloughs for others, but in vain."

This remarkable insect, perhaps the most extraordinary of our North American Dytiscidae, presents to the casual observer much the appearance of our larger Ilybii more especially of *Ilybius ater*; on closer inspection however the medially thickened antennae, the unique form of the penultimate joint of the labial palpi, the strongly produced and deflexed apices of the hind coxal processes, the extreme sexual development of the middle tarsi, and the long dense pilosity of the hind tibiae and tarsi (without doubt also a sexual character) at once attest its structural singularity.

As the tribes are at present defined, it is not quite clear whether our new genus should enter the Agabini or Colymbetini; there is in fact a disagreement among authors as to the precise makeup of these tribes. Sharp e. g. includes *Ilybius* in the Agabini because it agrees with the other members of the tribe in the smooth side pieces of the first dorsal abdominal segment, and the presence of a row of bristles at the outer apical angle of the hind femora. Zimmermann however in his work on the Dytiscidae of the Berlin Museum places *Ilybius* in the Colymbetini on the basis of the lobed apices of the first four joints of the hind tarsi and the unequal metatarsal claws, disregarding entirely the dorsal abdominal character used by Sharp. It seems then to be a question of deciding which characters are of greater fundamental importance. In either case the relative position of *Ilybius* remains unchanged. For obvious reasons I am unable to study the dorsal abdominal segments in the unique type of *Carrhydrus*, but it possesses the row of bristles at the apical angle of the hind femora, so characteristic of the Agabini, and the apices of the metatarsal joints are not at all lobed; moreover the sculpture of the surface is quite like that of many Agabini and has no parallel in any of our genera of Colymbetini. I am therefore at present inclined to place *Carrhydrus* before *Ilybius* and to include both in the former tribe.

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